EARTH SUMMIT IN FOCUS

Number 6

United Nations Conference on Environment and Development

Population Pressures: A Complex Equation

In any global equation, human beings are "the wild card", it is said. As primary consumers of the Earth's natural resources, people are both agents of development and victims of environmental degradation. They are also, potentially, the means of conservation.

Any development has an impact on the ecosystem. It would be naïve to think otherwise. But there is growing concern among countries of both North and South that human numbers and activities are challenging the planet's capacity for sustainable development—the ability to meet present needs without depleting the resources to support future generations.

"The relationship between population dynamics and the ecosystems on which the survival and well-being of people depend will be decisive in achieving sustainable development", says Maurice Strong, Secretary-General of the United Nations Conference on Environment and Development (UNCED), to be held in Brazil in June 1992.

World leaders convening in Rio de Janeiro for the Earth Summit will be asked to consider the complex links between demographic trends, environment and development. Specifically, they will be urged to draft measures to stabilize global population and to support each country in achieving a sustainable balance between its population, its resources and the quality of life to which its citizens aspire.

For policy makers, the issue is how demographic pressures relate to economic growth, consumption patterns, poverty and environmental quality. With economic growth comes increased consumption. As developing countries produce and consume more of the basic necessities that the developed world now takes for granted—from adequate food and housing to refrigerators and cars—the challenge will be to make such consumption sustainable. Growing human numbers place greater demands on land and water, generate waste and pollution, and encroach on the habitats of non-human species which share the biosphere. Population interacts with every major issue affecting the health of economies, peoples and the planet—from faltering gross domestic product (GDP) to forest loss and global climate change.

Does Population Matter?

Throughout most of the 1970s and early 1980s, population growth rates slowed worldwide, while economic growth picked up. Family-planning programmes in countries such as Thailand and Indonesia were hailed as models of achievement.

By the end of the 1980s, however, lower death rates had all but canceled out reductions in fertility. And in actual numbers, population continued to increase rapidly, borne on the momentum of earlier growth. At the same time, debt-ridden economies stagnated.

As development prospects dimmed, resources were exhausted or degraded, and infrastructure deteriorated or proved inadequate to support expanding populations. Growing numbers of migrants were forced onto marginal lands and into overcrowded cities: the World Bank estimates there may be as many as 14 million "environmental refugees" worldwide at present.

Few now deny that population belongs in the environment-development equation. But that's where agreement ends.

UNITED NATIONS

Economists for the most part have ignored or minimized the impact of population dynamics. Economic growth and technological improvements, in the traditional view, could extend almost indefinitely the Earth's capacity to support more people. The success of "Green Revolution" technologies that kept agricultural production ahead of population growth until the 1980s is often used to bolster this argument. Even the apparent limits of non-renewable resources could be overcome through ingenuity or substitution, proponents of this view claim. Market economics would be the engine to drive such change.

Most ecologists and population experts disagree. Population has been called everything from "the forgotten issue" on the environmental agenda to "today's number one environmental problem".

According to this argument, in a finite system—Earth—there are limits to even the so-called "renewable" resources needed for development. More people mean fewer resources and more pollution. Even technological fixes have their limits: the Green Revolution's high-yield, short-term gains were bought with toxic chemicals and soil-depleting methods that now call into question future productivity.

Most policy makers now acknowledge that balancing population and resources locally and regionally is necessary to achieve sustainable development, but there is reluctance to prescribe how that should be done. Some population experts and environmental groups are more vocal, calling for global population "control". In a chapter of *The Population Explosion* titled "Why Isn't Everyone as Scared as We Are?", researchers Paul Ehrlich and Anne Ehrlich assert: "Arresting global population growth should be second in importance only to avoiding war on humanity's agenda."

Ultimately, however, the population-environment-development equation is too complex to reduce to causal explanations or global prescriptions. A group of social scientists representing both North and South recently suggested that what is needed is a far more "nuanced" understanding of the social and economic factors that mediate between people and the environment. "The 'population problem' does not just involve absolute numbers of people, or even just population densities or overall rates of increase", they state. "It also involves, in important ways, such factors as patterns of production, consumption, and distribution."

The Development Paradox

The complex interrelationship between population, environment and development is sometimes known as the *development paradox*: while development can slow population growth, population pressures can slow development by diverting natural and economic resources.

"There is a global recognition that continuation of the present rates of population growth will deter most, if not all, efforts to reduce environmental degradation", an UNCED secretariat report states. "[And] the lack of development is a paradoxical contributor to increased population growth."

Important as it is, the population-environment-development linkage is hard to quantify. In one groundbreaking effort, the Government of Rwanda calculated the amount of money the country would save in its health, education and agriculture sectors over a 30-year period if a fertility reduction programme were implemented. The result: more than two years of Rwanda's current GNP.

Numbers Count

There are 5.48 billion people in the world today. Every second, three more are born. According to UN projections, some 97 million people will be added to the globe each year throughout the 1990s. By the end of the decade, human numbers will have grown by some 1 billion, the present populations of Africa and Latin America combined. World population, expected to reach 8.5 billion by 2025 and 10 billion by 2050, could pass 20 billion by 2150 unless checked.

But population size alone is not the point. More important is how fast, and where, population is growing.

Population increases exponentially. The average "doubling time" of countries in the developed world is 146 years. In developing countries it is just 37 years and, in some cases, far less. In Zambia, Côte d'Ivoire and Saudi Arabia, for example, the population doubles every 18 years. Afghanistan, with the

world's fastest-growing population, will have twice as many people in just 10 years.

Globally, population growth has slowed from a high of 2.1 per cent in the 1960s to 1.7 per cent at present. In many industrialized countries and a few developing countries, fertility has fallen below replacement levels. But even though the number of children born is decreasing, the number of women of childbearing age remains high—the result of past population growth. In some developing countries—particularly in sub-Saharan Africa and western Asia, where average family size is still six or more children—the "steamroller" effect of population momentum isn't expected to slow until well into the 21st century.

As much as 97 per cent of anticipated population growth between now and 2050 will take place in developing countries—the areas least able to cope with additional pressures on their economies and environments. With 4.1 billion people at present, developing areas already account for more than 80 per cent of the world total.

At a time when economic growth is stagnant, population growth remains rapid throughout parts of Asia, Latin America and sub-Saharan Africa. What some call the "scissors effect" of poverty and population pressure stresses already marginal lands and urban infrastructures, and strains the ability of Governments to meet even the basic needs of their citizens.

Human Impact

It is a common misconception to think of population pressure as a matter of crowding: too many people in too little space. Like rate of growth, however, population density by itself is not the problem. Japan, for example, with 320 people per square kilometre of land, is ranked first of 160 countries on the Human Development Index formulated by the United Nations Development Programme (UNDP), while Mali, with only 6 people per square kilometre, is 156th. Where people live relative to the resources and resiliency of the ecosystem and the economy is more important than population size or density in determining sustainability. Even sparsely settled areas, including much of Africa and the Amazon rainforest, have difficulty supporting existing populations where habitable land is scarce and essential resources are degraded or lacking.

The number of people an area can support without compromising its ability to do so in the future is known as its *population carrying capacity*. "Carrying capacity" is a broad concept involving many factors, from availability of fresh water and productivity of land to trade levels and amount of external debt. Far from a fixed measure, it shifts constantly with human activity.

"Human activity" is in itself a broad concept, varying widely with location, income and level of development. Essentially, however, the following interacting variables influence how population pressures impact on the environment in any given place:

- the absolute number of people using the resources;
- the level of consumption of environmentally sensitive goods, determined by lifestyle, income and socio-economic standards;
- the practices used to harvest or protect resources;
- the type of technologies that draw on the resources, and the type and amount of wastes generated;
- the export levels of local resources;
- the role of social, economic and political institutions in resource management;
- the resiliency of nature.

To consider the relationship between population and resources for countries at different levels of development, Paul Ehrlich and Anne Ehrlich have suggested a formula, I = PAT, where I equals human impact on the environment, P stands for population factors (including size, growth rates and distribution), A equals per capita consumption, determined by income and lifestyle, and T stands for environmentally harmful technologies that supply A. There is a multiplier effect among the variables; their impacts compound one another.

The formula is intended to show how large populations in developing countries, despite limited economic and technological resources, can nonetheless impact heavily on the environment—and conversely, how the relatively smaller populations in industrialized countries can have an impact as large or larger. "Two groups in particular are responsible for a disproportionate share of environ-

mental degradation: the world's top billion richest and bottom billion poorest", states a report by the United Nations Fund for Population Activities (UNFPA).

Where Human Activities Hurt Most

At every level of development, human beings consume resources to meet basic needs for food, water, shelter and fuel. Human activities impinge on the environment most when consumption outpaces the ability of a resource to recover or renew.

In the developing world, the most pronounced effect of population pressures is on so-called "renewable" resources: soil, water, forests. Three quarters of the people in the South live in ecologically fragile areas. Poverty forces them to exploit their limited stocks just to survive, leading to overcropping, overgrazing and overcutting at unsustainable rates. A vicious circle of human need, environmental damage and more poverty ensues.

By the year 2100, 65 per cent of cropland in Asia, Africa and Latin America will be lost, according to the Food and Agriculture Organization of the United Nations (FAO). In India alone, erosion, salinization and waterlogging—by-products of the Green Revolution—have destroyed some 1.75 million square kilometres of land, an area about the size of Rwanda. Desertification now threatens one third of the world's land, affecting 850 million people.

With growing populations, existing land must be subdivided into ever smaller plots. A study of 57 developing countries found that almost half the farms are now less than one hectare. Where plots are too small for even subsistence farming, as in parts of Nepal, farmers are forced onto ever more marginal lands, often destroying forest cover in the process. In India, Pakistan and Bangladesh, more than 30 million rural households have no land at all.

The Urban Explosion

As population pressures break down fragile ecosystems, people are forced to move elsewhere to survive. Depleted resources are contributing to an urban explosion in developing countries, where city dwellers are expected to increase from 1.5 billion—37 per cent of the total population—in 1990 to 4.4 billion, or 61 per cent, in 2025. By the end of this decade, an estimated 75 per cent of Latin America's population, 42 per cent of Africa's and 37 per cent of Asia's will be urbanized. Some 50 cities in the South will have over 4 million people. Mexico City, the world's most populous metropolis, is expected to top 25 million by the year 2000.

But promises of a better life for city dwellers are often elusive. In cities, as in rural regions, the poor are often forced to marginal areas: in this case, slums and shanty towns. Burgeoning populations not only tax infrastructures and generate waste and pollution but also increase pressures on outlying lands that supply food, water and fuel.

A Curse of Riches

Prosperity, too, can lead to environmental stress. Industrial development has been called "a curse of riches". Developed countries, with their level of economic wealth, are able to produce an abundance of goods. But supplying industry, agribusiness and —in many countries of the North—market-driven, high-consuming lifestyles places heavy demands on non-renewable energy and mineral resources. By-products of such consumption—including acid rain, ozone-depleting gases, toxic waste and accumulated rubbish—have grave and increasingly global consequences.

In industrialized societies, fewer people make a bigger environmental impact. With 25 per cent of the world's population, the developed countries produce 50 per cent of the world's greenhouse gases. One person in the North, according to UN figures, consumes 14 to 115 times more paper, 6 to 52 times more meat and 10 to 35 times more energy than a person in a developing country. The United States, the ultimate "throw-away" society, generates twice as much garbage as any other country in the world. According to the US Environmental Protection Agency, the 1.1 million tons of disposable plates and cups that Americans toss out each year would serve everyone on Earth six times over.

Newly emerging industrial societies in the South now face many of the same problems as industrialized areas in the North. At least 70 per cent of the world's urban dwellers, most of them in developing countries, breathe polluted air, according to the

World Health Organization (WHO). Acid rain also poses threats: in China, there is growing concern that damage to rice stocks will cause widespread shortages.

Young and Old

The youthful age structure of developing countries—nearly 50 per cent of Africa's population is under 15—poses another serious challenge to economic and social development. The South must create a minimum of 30 million new jobs yearly throughout the 1990s—10 million in sub-Saharan Africa alone—just to avoid deepening unemployment.

At the other end of the life span, reductions in mortality mean growing numbers of elderly people. Increasingly, developing countries, as well as developed, are having to provide economic and social support for the aged.

Threatened Resources

Unsustainable consumption of resources such as water and forests challenges both South and North. Freshwater stocks are especially vulnerable to population pressures. At least 1.7 billion people—nearly one quarter of the world's population—lack enough drinking water, WHO estimates. Increased demands by agriculture and industry tax stocks from reservoirs, rivers and non-renewable aquifers. As use increases, so does pollution. In parts of sub-Saharan Africa, the Middle East and Asia, freshwater demands may exceed reserves in 10 to 15 years—in some cases, even sooner. By 2025, it is predicted, more than 1 billion Africans—two thirds of the total population—are likely to face water shortages.

In industrialized countries, water resources are often taken for granted. But there, too, human activity—from farming and hydroelectric power-generating to lawn-sprinkling—takes a toll. Salinization, which has lowered agricultural yields 24 per cent worldwide, has decreased yields as much as 30 per cent in the United States.

Conflicts over water resources are likely, experts fear. Already, there are disputes over shared waters of the Ganges, La Plata and Jordan Rivers. In the United States, communities are fighting "water wars" in the courts.

Forest loss in both South and North is a prime example of uneasy efforts to balance nature and human needs. By the year 2000, half the world's forest cover will be gone. Forests are a vital resource. The "lungs of the planet", they transform atmospheric CO_2 into oxygen and thus play a role in stemming global warming. They are also the primary fuel source for 70 per cent of families in the developing world. Slash-and-burn farming for subsistence has devastated forests from Thailand to Bolivia, eroding soils.

Tropical forests are home to between 50 and 80 per cent of Earth's plant and animal species. Clearing them for cash-cropping, timber and cattle-grazing—mostly to supply markets in industrialized areas—threatens biodiversity. Half the world's pharmacopoeia originates in wild species. One species an hour, 10,000 a year, are disappearing, it is estimated. From New Zealand to the Pacific Northwest region of the United States, battles have erupted between loggers and conservationists trying to save wildlife habitats.

In industrialized countries, air pollution and acid rain are also killing woodlands. In the first study to quantify such effects, the International Institute for Applied Systems Analysis found that 75 per cent of European forests were succumbing to high sulfur levels.

Quality of Life

A 1982 FAO/UNFPA study found that, in theory, the developing countries exclusive of China could feed up to 33 billion people on existing land. But speculating on how many people the Earth could support begs an obvious question: what kind of life could 33 billion—or even 10 billion—expect to have?

"It's beyond my comprehension", Paul Ehrlich has said, "that we should run an experiment to see how many people we can cram on the planet before all its systems collapse."

Increasingly, talk of "carrying capacity" is giving way to the notion of *social* carrying capacity. Emphasizing quality of life over sustainment of life, it underscores the idea that the goal of development is *human* development, or increasing people's choices.

"Income is one aspect of those choices, but it is not the sum-total of human existence", states UNDP's *Human Development Report 1991*. "Health, education, a good physical environment and freedom—to name a few other components of well-being—may be just as important", adds the report, which includes natural resource stocks and contraceptive prevalence among a broad range of indicators.

Countries with rapid population growth rates and high fertility rank lower on various "quality-of-life" indexes. Afghanistan, for example, with an average of 6.8 births per woman and one of the world's highest growth rates—6.7 per cent, as against 2.1 per cent for developing countries as a whole—is 157th of the 160 countries on UNDP's Human Development Index, and is among the 30 countries in the "extreme suffering" range on the International Human Suffering Index drawn up by the Population Crisis Committee.

It is common to divide the world between "rich" developed countries of the North and "poor" developing countries of the South. But in both South and North there is a growing gulf between rich and poor.

Poverty, population pressures and development are linked in myriad ways. For example, malnutrition and undernutrition—consequences of impoverished lifestyles—are associated with impaired physical growth and mental inadequacies. Children affected by pre-natal and prolonged malnutrition scored lower on intelligence tests in a number of countries, including China, India, Thailand, Kenya and Guatemala. Other studies show the effects of poor diet on attention span and school performance. In the Philippines, for instance, underfed children—measured by low weight-for-height—scored lower on mathematics tests than those who were adequately nourished.

Such deficiencies threaten not only individual but community development. Thus, the interrelationships between personal, environmental and economic health may hold keys to achieving sustainable societies.

"One of the clearest lessons of the last two decades of work in population", says UNFPA Executive Director Nafis Sadik, "is that investments in human-resource development—for example, improvements in women's status, access to education, health and the means of family planning—not only improve the quality of life but are also the best and quickest way to reduce population growth rates."

A Matter of Choice

According to UNFPA, some 300 million women of reproductive age lack access to family planning. Providing couples with the means to limit family size could mean 2.2 million fewer births by the year 2010.

But access to family planning information and methods is not all that determines family size. Such decisions are also influenced by culture, religion, politics and economic circumstances. In Africa, for example, a child is seen as a blessing on a family's past and future—"one twig on the vast African tree of life", as former World Bank president Robert McNamara once put it. In traditional societies, children are important contributors to the labour force, and are old-age insurance for their parents. Poverty increases the likelihood of larger families: wherever child survival remains risky, there is a pull to produce more.

Fundamentalist religions tend to be pro-natalist. Islamic countries of northern Africa and western Asia have some of the highest birth rates in the world. But increasingly, couples' desires for smaller families are overriding religious dictates. Catholic countries, for example, show some of the world's lowest fertility rates. Italy's, at 1.4 births per woman, is well below replacement level.

How a society views women affects fertility. Where the status of women is low—and tied to childbearing—birth rates tend to be higher, as in western Asia and parts of Africa. Preferences for sons in some societies influence birth rates and child survival. In India, rural parents with three or more sons were found to be more than twice as likely to use family planning as those with only one son—and more than three times as likely as parents with three or more daughters and no sons.

But as UNFPA points out, cultural imperatives on family size are changing around the globe. Experiences in Latin America and Asia show that where policies and programmes support choice—including maternal and child health and opportuni-

ties for women—values can change fast. In some countries men, too, are beginning to assume more responsibility for family planning. In the Republic of Korea, for example, the ratio of male contraceptive users to female is 1 to 2; formerly, it was 1 to 5.

Critical Decade, Critical Choices

Governments as well as individuals are increasingly realizing that when the goal is a decent life within sustainable limits, too many children mean too few choices.

The 1990s have been called the "critical decade" for countries to take decisive action to balance population size and growth rates with available resources and the ability of their economies to provide for the needs of present and future generations. States a paper prepared for UNCED by the British Government: "The great merit of introducing a demographic perspective into all policy and project planning is that it would introduce essential historical and forward-looking perspectives."

The World Commission on Environment and Development—the Brundtland Commission—urged that "all should keep in mind that sustainable economic growth and equitable access to resources are two of the most certain routes toward lower fertility rates". Some countries have attempted to reduce fertility rates through coercive or Draconian measures. But population policies that don't take into account the aspirations of their constituencies are ultimately doomed to failure, experts point out. Governments which combine population programmes with health, education, employment and rural development projects—especially those that benefit women—are seeing the best results.

Among such success stories is Indonesia's. Fertility dropped from 5.6 births per woman in 1970 to 3.1 at present, as a result of a family planning effort that integrates a broad range of benefits for women, from income-generating activities and health measures to agriculture and literacy programmes. As women's educational opportunities and participation in the workforce increased, their average marriage age rose from 19 to 22—another factor that tends to decrease family size. Indonesia is also the first country to institutionalize the link between population and environment by setting up a combined population-resources ministry.

The link between education and population size is strong. In Thailand, where the female literacy rate is 96 per cent, fertility is just over 2 children per woman. By contrast, in Pakistan, where female literacy is less than 25 per cent, the average number of children per woman is 6. In Botswana, a woman with no education will produce, on average, 6 children, while one with at least a secondary school education will have 4.

Zimbabwe—another country which actively promotes women's development—has seen its fertility rate drop from more than 7 children per woman in 1986 to just over 5. In the Republic of Korea, the effect of social investment in women is particularly dramatic: between the 1960s and 1988, the number of girls finishing secondary school rose from 25 per cent to 86 per cent, while fertility fell from 5.4 children per woman to below 2.

The Population Agenda

In the preparations for UNCED, there has been some reluctance among developing countries—even those, such as India, which have had official population policies for years—to bring population into discussions of environment and development. The fear has been that such discussion would shift the focus of debate to population growth in the South—and away from the North's contribution to global environmental degradation and its obligation to provide correctives.

Now, policy makers in both North and South are discussing how to balance the population-environment-development equation. There is widespread agreement that even though the goal is *world-wide* sustainable development, action to achieve it must be particular and local.

The Women's Action Agenda 21, adopted last November by the World Women's Congress for a Healthy Planet, links women's rights with population policies. The Agenda, to be considered by UNCED this spring, notes that some 500 million couples around the world would like to plan family size but do not have access to the means to do so. Local action should include "women-centred, women-managed reproductive health care and

family planning'' and the provision of information.

A report by the UNCED secretariat also points to the link between economic empowerment of women and their social progress: ''Population and environment programmes must act as catalysts to mobilize women, alleviate their burden and improve their capacity to participate in and benefit from socio-economic development.''

Focusing on the needs and interests of women is clearly the key to successful population planning. At the same time, any attempt to blame women's fertility for environmental destruction is to be avoided. ''This analysis, if unchallenged, lays the groundwork for the re-emergence of top-down, demographically-driven population policies and programmes'' that deny women's reproductive freedom, the Women's Congress concluded.

Population and a planet in balance: the equation is clearly complex. The debate in preparation for the Earth Summit has focused attention on that complexity, and the decisions taken in Rio will be one step forward in finding a solution.

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Published by the United Nations Department of Public Information
DPI/1200—92202—February 1992—15M